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ABSTRACT

Techniques for improving the lecture and notetaking skills of students in the biological and biomedical sciences are presented in this guide. These students frequently find the need to re-organize existing notetaking skills because of the vast amount of material that has to be learned and the importance of efficient learning to the process of studying. In addition, learning in the sciences is enhanced by systematically organizing content, by attending to the lecture and textbook, and by practicing or reviewing material in an organized fashion. The guide is divided into three parts. Topic areas in these parts are: (1) basic mechanics of notetaking (considering briefhand, concept headings and words, organizers, and the schedule plan); (2) lecture notetaking (focusing on the notetaking process, outlining techniques, and the key word and summary method for taking and reviewing lecture notes); and (3) text notetaking (considering the process of taking text notes and the seven commonly agreed on approaches). Study questions, review questions, and practical exercises are included. A self-assessment scale is also included to assist in evaluating notetaking strengths and weaknesses. (JN)

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EFFECTIVE NOTE-TAKING:

A GUIDE FOR STUDENTS IN THE

SCIENCES AND HEALTH PROFESSIONS

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PART ONE

INTRODUCTION

This note-taking guide presents techniques for improving lecture and text note-taking skills. Frequently, students in the biological and bio-medical sciences find the need to re-organize existing note-taking skills because of the vast amount of material that has to be learned and the importance of efficient learning to the process of studying. Learning in the sciences is enhanced by systematically organizing content by attending to the lecture and textbook, and by practicing or reviewing material in an organized fashion. Improved note-taking skills do not occur simply through use of this guide, but as with most skills, improvement occurs with practice which is promoted in this guide.

A self-assessment scale is presented on the next page to assist in evaluating your strenths and weaknesses as they pertain to note-taking. Please respond to the scale items relative to your existing abilities and skills as they pertain to note-taking.

THE STUDENT SELF ASSESSMENT INVENTORY: NOTE-TAKING SCALE*

INSTRUCTIONS: This inventory will help you assess how you prepare for courses and manage time. Please respond honestly to each statement.

	Never	Rarely	Sometimes	Often	Always
1. I take both textbook notes and lecture notes.	1	2	3	4	5
2. I review notes that I take from my textbook.	1	2	3	4	5
3. I check the accuracy of my lecture notes after each lecture.	1	2	3	4	5
4. I preview lecture topics in my textbook prior to class.	1	2	3	4	5
5. I take a lot of notes during lectures.	1	2	3	4	5
6. I maintain separate notes for each class.	1	2	3	4	5

PLEASE NOTE:

In the remaining items, a rating of "5" will correspond with Never, "4" with Rarely, etc.

	Never	Rarely	Sometimes	Often	Always
7. In taking notes from my textbook, I tend to write down so much material that it is not a worthwhile procedure.	5	4	3	2	1
8. When exam time rolls around, I have more notes than I have time to study.	5	4	3	2	1
9. After taking notes, at times I do not understand what my notes mean.	5	4	3	2	1
10. At times I end up taking notes on unimportant material.	5	4	3	2	1
11. My lecture notes do not make sense to me when I reread tham after a lecture	5	4	3	2	1
12. I usually borrow another student's lecture notes because I do not understand my own notes.	5	4	3	2	1
13. Most professors talk too fast for me to be able to record all of the important points.	5	4	3	2	1

* Frierson & Stevenson, 1980

Scoring Instructions:

The SSAI Note-Taking Scale provides you with an estimate of your note-taking skills based on your responses. Scales on learning strategies, time management and test taking are also available through the authors.

List your numerical rating for each question.

Note-taking

Question 1 ____

2 ____

3 ____

4 ____

5 ____

6 ____

7 ____

8 ____

9 ____

10 ____

11 ____

12 ____

13 ____

sum = ____

N = 13

Add the values you listed in the blanks and divide by "N" (13). An average of 3.5 of less indicates that you should cover the complete study guide. An average higher than 3.5 but 4.5 or less indicates that your study skills are good, but not perfect. Review the guide for additional tips that should improve your skills. An average grreater than 4.5 suggests that your skills are very good, however, you may still wish to review this guide for additional tips that will prove helpful to you.

REVIEW AND PRESENTATION

OF BASIC MECHANICS

Before we begin discussing and presenting note taking strategies let's look at four time saving and organizational tactics: Briefhand, use of concept heads organizers, and time management.

BRIEFHAND

Briefhand is a system of abbreviations and symbols that can be used to reduce time in note-taking normally spent on spelling out full words.

Simplicity is the key to the development of a briefhand system. Simplicity helps to minimize the confusion that short cuts sometimes cause, especially when briefhand symbols have been self created.

Some standard briefhand notations are listed below:

change Δ ⓞr Ch	gram g
about @	therefore ∴
you u	book bK
why y	increasing/rising/high ↑
because 'auz ⓞr b/c ⓞr becuz	decreasing/falling/low ↓
with w/	unchanged - un Δ ⓞr uCh
without w/o	approximately appr.
within w/in	next related point nx rel ⊙
between bhwn ⓞr b/t	right Ⓡ
through thru	left Ⓛ
meeting mtg	calorie cal
number #	compound Cmp
question ?	substance Sub
male ♂	physical diagnosis px dx
female ♀	pathology Path
national nat'l	psychiatry Psych
organism orgm	bacteriology bact
weight wt	neuroanatomy neuro

Now it's your turn. Create your own briefhand notations.

CONCEPT HEADINGS AND WORDS

Concept headings are key words or linking words that help organize, classify and categorize subject matter. Concept headings are words that help clarify relationships between or among the topics and their related details.

Concept heads can also serve as study aids for examinations. A professor can use concept words in exam questions because of their general character. Many exam questions are generated from concept words.

When organizing notes in categories using subject related concept words, you are beginning to think in the manner of a professor who is organizing his/her notes for class. Using this approach you will be able to develop some possible exam questions on your own!

A LIST OF SOME CONCEPT WORDS THAT CAN BE USED AS HEADINGS

function
importance
kinds
mobility
morbidity
organization
size
type
source
incidence
characteristics
reason
location
effect
composition
appearances
movement
shape
parts
innervations
color
orgin
insertion

Hear is an example of concept words in use. Concept words used in this example are: parts, composition, location, shape, effect, function, location, appearance, characteristics, and movement.

Read passage:

Molluscum Contagiosum

"Molluscum contagiosum is a benign skin disease characterised by the occurrence of raised, umbilicated, waxy cutaneous nodules. The lesions may be multiple, in which case the diagnosis usually is made clinically, or single, in which case the lesion may be suspected of being neoplastic and often is excised for diganosis. The lesions heal spontaneously, usually after a few months, and are not associated with constitutional symptoms." (p. 252)[1]

Title: Molluscum Contagiosum

- type
  - benign skin disease

- characteristics
  - raised skin nodules
    - umbilicated
    - waxy
  - skin lesions
    - single
      - considered neoplastic
      - generally excised for diagnosis
    - multiple
      - diagnosed clinically
    - heal spontaneously
      - usually 2 months
    - not associated with constitutional symptoms

What are some other concept words? List concept words below.

Read the following passage. Ouline the passage using appropriate concept headings. Compare your outline to the example on the next page.

"Herpes zoster. Herpes zoster (shingles) is characterized by the formation of an erythematous and vesicular eruption along the course of sensory nerves. The lesions occur on the trunk or face and usually are associated with pain, discomfort, fever, and malaise. Involvement of the eye (zoster ophthalmicus) may have serious results unless treated promptly."(p. 248) (2)

Title: Herpes Zoster (shingles)

- characteristics
    - eruptions along sensory nerves
        - types
            - erythematous
            - vesicular
        - location
            - trunk
            - face
        - symptoms
            - pain
            - discomfort
            - fever
            - malaise

This example has four concept headings: characteristics, types, locations, and symptoms. By familiarizing yourself with the topics associated with the four concept words, you have firmly grasped the meaning of the passage.

ORGANIZERS

Organizers enable the learner to prepare for the process of learning. By using organizers, you will be more knowledgeable about a lecture before it takes place and will take better, more comprehensible notes. You will find that you are more prepared for exams (see the time management system).

Organizers for lectures and text note taking include: 1) following a course syllabus and handouts, and 2) determining concept headings which are appropriate to the area being studied. The former enables the formation of "mental outlines" of topics to be covered. The latter minimizes the difficulty of transferring the "mental outline" from mind to notebook.

Organizers appropriate for lecture note taking are defining the instructor's lecture style, skimming the text so that the lecture topic will be familiar and concept words can be developed (for a text, reading the introduction and/or summary of a given unit and skimming unit titles).

SCHEDULE PLAN

TIME MANAGEMENT

Time management, the key to learning and organization, will insure coverage of material in a balanced time frame. Good time management will also facilitate retention of learning by allowing material to be practiced (repetition).

Though many time management approaches exist, use of a schedule plan is encouraged and will be discussed here.

THE SCHEDULE PLAN

Schedules provide time for activities which need to be undertaken during a given period of time. A schedule is self-determined and self-enforced. On occasion, you can find positive reinforcement for following a schedule through student support personnel or through classmates. Which approach would work best for you?

Schedules maximize time usage and reduce the need, at the last minute when fear strikes, for cramming. REMEMBER: Cramming does not facilitate long-term memory.

There are basically two types of schedules: flexible and rigid. In following the rigid schedule, all time and activities are recorded and carried out for the specified amount of time, whether you finish the task or not. When time runs out for studying a subject, you move on to the next subject. You can see why it is important to include specific activities, including meals, in the rigid schedule.

With a flexible schedule, a daily goal is established for each subject to be covered, and time is allotted to carry out the general goal. If you do not finish the task, you may continue beyond the scheduled time to work on that subject. If you finish early, then you can move on to another task or a break.

Models of the flexible and rigid schedule plans are attached, along with two blank copies of a schedule for your own use.

The schedule plan can be undertaken with assistance of learning skills specialists or can be developed independently.

STUDY PLAN - LECTURE (3)*

TIME	NOTETAKING	TEXTBOOK	HANDOUTS
BEFORE LECTURE		Read the assigned pages or at least read special type (italics, etc.).	Read the assigned pages or at least scan terminology. Organize objectives.
DURING LECTURE	Identify lecture. Write everything, one side of page only		
IMMEDIATELY AFTER LECTURE	5-minute recap: Identify important topic(s) and what you need to know about each topic		
SAME DAY	Fill-in notes On opposite page: organize & summarize information Integrate information from handouts Integrate information from textbook Review notes	Read, mark-up	Complete, as appropriate
SAME WEEK	Integrate information from textbook Review notes	Complete reading and marking-up	
END OF TOPIC	Prepare review materials Check: complete consistent clear Review notes	Review reading assignments	Review handouts

*Adapted from a model developed by Dr. Miriam Willey and Ms. Barbara Jarecky, 1976 (see footnotes).

EXAMPLE OF A MEDICAL STUDENT'S SCHEDULE

FIXED

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
8-9 Breakfast	"	"	"	"	"	"
9-11 Histology	Path 9-11	9-11 Histology	Path 9-11	9-11 Study Group Biochem	9-12 Neuro Reading	9-10 Path Reading
11-12 Histology Review	Path Review 11-12	11-12 Histology Review	Path Review 11-12	11-12 Reading Lab		10-1 Church
12-1 Lunch	Lunch 12-1	Lunch 12-1	Lunch 12-1	Lunch 12-1	Lunch 12-1	1-2:30 Dinner
1-4 Neurophysiology	Biochem 1-4	1-4 Neuro.	Biochem 1-4	Histology Reading 1-6	Biochem Reading 1-5	2:30-6 Biochem
4-5 Neurophys Review	4-5 Biochem Review	4-5 Neuro Review	4-5 Biochem Review	My time 6-until	5-8 Path Reading	6-7 Supper
5-6 Dinner	5-6 Dinner	5-6 Dinner	5-6 Dinner		My time 8-until	7-8 Preview for week
6-8: Pathology 8-9: Exercise 9-12: Prepare for Tues. lectures	6-8: Histology 8-9: Exercise 9-12: Prepare for Wed. lectures	6-8: Neuro 8-9: Exercise 9-12: Prepare for Thurs. lectures	6-8: Biochem 8-9: Exercise 9-12: Prepare for Fri. lectures			8-12: Preview for Monday's lectures

EXAMPLE OF A MEDICAL STUDENT'S SCHEDULE
FLEXIBLE

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
9-1 Histology	9-1 Path	9-1 Histology	9-1 Path	9-11 Biochem	9 am - 8 pm Reading	1-11 pm Review of week and preview of next week Prepare for Monday's lecture
1-5 Neuro	1-5 Biochem	1-5 Neuro	1-5 Biochem	11-12 Study Group Biochem	8-until My time	
5-6:30 Dinner & Break	5-6:30 Dinner & Break	5-6:30 Dinner & Break	5-6:30 Dinner & Break	12-6 Text Reading		
6:30-9 Reading & Review	6:30-9 Reading & Review	6:30-9 Reading & Review	6:30-9 Reading & Review	6-until My time		
9-12 Prepare for Tues. lectures	9-12 Prepare for Wed. lectures	9-12 Prepare for Thurs. lectures	9-12 Prepare for Fri. lectures			

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
21						22

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
23						24

Study/Review Questions

1. List 10 briefhand notations and the terms they stand for.

2. How are concept words and headings used in studying?

3. List 5 concept words.

4. List lecture-appropriate organizers (3).

5. List text-appropriate organizers (3).

PART TWO

LECTURE NOTE-TAKING

LECTURE NOTE-TAKING REMINDERS FROM PART ONE

Now is the time for the topics discussed in Part One to be employed. Briefhand, Concept headings, and Organizers will be the topics emphasized in this section.

Useful organizers for lectures include:

1. The course syllabus
2. The professor's lecture style
3. Text book coverage of the lecture topic
4. Concept headings

One of your goals should be to provide structure and organization to the process of studying and also develop a study plan and schedule.

THE NOTE-TAKING PROCESS

An effective lecture note-taking process for enhancing learning involves:

1. Reading or at least previewing materials to be covered in the lecture.

2. Recording everything the instructor states during a lecture that pertains to the topic.

3. Starring (*) unclear lecture areas in your notes so that you can return to them later and ask the professor or a classmate clarifying questions.

4. When missing information, leave gaps in your notes and bracket ([ ]) the gaps so that they can be filled in later.

5. Reviewing lecture notes on a daily basis.

6. Mentally summarizing key points in a lecture.

7. Writing lecture notes in the instructor's words, not yours.

8. Rewriting your notes using an outline format.

The first six points facilitate retention by allowing repetition and practice. The latter steps need to be looked at in more detail.

Regarding point seven, some believe that recording lecture notes in your own working is an effective method for remembering material. You will rarely, however, be examined on your version of the lecture. When a lecture is not recorded using the lecturer's terminology and order of presentation, key points and understandings can be missed.

You will find that by using the instructor's wording and order when taking down a lecture you will not miss key points as readily. Your notes will then be a more accurate reflection of what was presented.

Some professors allow students to tape-record lectures. Recording might become a temporary solution for note-takers who are afraid of missing information or who have not developed or used the SHORT CUTS. One drawback with using a tape-recorder is the amount of time required to transfer the taped lecture onto paper.

Learning to take notes employing the approach listed above is faster and more effective for retention purposes.

OUTLINING TECHNIQUES

The outlining technique refers to point eight in the preceding section. Three different methods of outlining will be discussed: paragraph, sentence, and phrase forms.

Read the following passage:

> Form influences the organization of the various outline formats. All formats utilize a method. The methods incorporate major and minor points and endeavor to show the relationship between the points. The paragraph form is considered to be the poorest, yet easiest, approach for outlining. The goal in using the paragraph form is to continue writing about a topic until the idea changes. A new paragraph is begun when the idea changes. The sentence form consists of numbered statements which require some outlining but minimal organization. The standard outline format has the best organization but is the most difficult to master. The standard outline format utilizes Roman numerals, letters, numbers, and indentations to show organization. The decimal outline format is similar to the standard outline format, except that decimals and numbers are utilized, making the outlining process more complicated. The dash or indented outline format, like the decimal format, is an adaptation of the standard outline format. The dash format utilizes dashes instead of symbols, is simple, and has good organization. The standard outline or dash/indented outline formats are the preferred outline approaches, utilized either independently or in a combination form.

On the following pages, the passage has been outlined employing the approaches mentioned in the passage. Skim each outline format, paying attention to the stylistic and format differences.

An Example of

THE PARAGRAPH FORM

Form influences organization--must have some method, show major points, secondary, relationship between these. Paragraph Form--easiest, poorest, write until idea changes, begin new paragraph. Sentence Form--numbered statements, some outline, minimal organization. Standard Outline Form--best organization, most difficult; uses Roman numerals, letters, numbers, indentation to show organization. Decimal Outline Form--like Standard Outline Form, only uses decimals, complicated. Dash Outline Form--adaptation SOF also, but uses dashes not symbol; good organization, simple. Preference: Standard Outline Form and Dash Outline Form, perhaps combine.

An Example (taken from preceeding pages) of

THE SENTENCE FORM

1. The form of taking notes is important.
2. It provides organization by showing major points, minor points, their relationship to each other, and details.
3. The Paragraph Form is the easiest to use and the poorest.
4. For the Paragraph Form, you write as a paragraph until the idea changes.
5. The Sentence Form, a little more difficult and a little better, is a series of numbered statements.
6. The Standard Outline Form is the best for organization and the most difficult to follow.
7. Roman numerals, letters, numbers, and various types of indentation are used in the Standard Outline Form.
8. The Decimal Outline Form is a variation of the Standard Outline Form, but is based on the decimal system.
9. The Decimal Outline Form is complex.
10. The Dash Outline Form is also a variation of the Standard Outline Form, but uses dashes instead of symbols.
11. The Dash Outline Form has organization, and avoids the confusion of the previous outline systems mentioned.
12. The Standard Outline Form and the Dash system are best, although you may prefer to combine forms.

THE PHRASE FORMS

Phrase forms include the standard, decimal, and dash/indented outline formats. Examples of each format will be presented.

THE STANDARD OUTLINE FORM (SOF)

I. Form of Taking Notes

   A. Form is important

   B. Form Provides Organization

      1. major points
      2. minor points
      3. relationship between them
      4. details

II. Comparison of Forms

   A. Paragraph Form

      1. easiest
      2. poorest

   B. Sentence Form

      1. more difficult
      2. better

   C. Standard Outline

      1. best for organization
      2. most difficult
      3. indenting
      4. symbols

   D. Decimal Outline

      1. like standard
      2. with numbers and decimals
      3. unfamiliar and complex

   E. Dash Outline

      1. like SOF
      2. with dashes instead of complex symbols

         a. fairly simple
         b. good organization

III. Preferable: Standard or Dash or a Combination

THE DECIMAL OUTLINE FORMAT

1.0 Form of Taking Notes

- 1.1 Form is Important
- 1.2 Form Provides Organization
  - 1.21 major points
  - 1.22 minor points
  - 1.23 relationships between them
  - 1.24 details

2.0 Comparison of Forms

- 2.1 Paragraph Form
  - 2.11 easiest
  - 2.12 poorest
- 2.2 Sentence Form
  - 2.21 more difficult
  - 2.22 better
- 2.3 Standard Outline
  - 2.31 best for organization
  - 2.32 most difficult
  - 2.33 indenting
  - 2.34 symbols
- 2.4 Decimal Outline
  - 2.41 like standard
  - 2.42 with numbers and decimals
  - 2.43 unfamiliar and complex
- 2.5 Dash Outline
  - 2.51 like SOF
  - 2.52 with dashes instead of complex symbols
    - 2.521 fairly simple
    - 2.522 good organization

3.0 Preferable: Standard or Dash or a Combination

THE DASH/INDENTED OUTLINE FORMAT

-Form of taking notes

- -form is important
- -form provides organization
  - -major points
  - -minor
  - -relationship b/t
  - -details

-Comparison of forms

- -paragraph
  - -easiest
  - -poorest
- -sentence
  - -more difficult
  - -better
- -standard
  - -best for organ.
  - -most diff.
  - -indenting
  - -symbols
- -decimal
  - -like standard
  - -numbers
    - --decimals
  - -unfamiliar
- -dash (indented)
  - -like S.O.F.
  - -uses dashes
    - --simple
    - --good organ.

-Preferable form

- -standard
- -dash (indented)
- -combination

Study/Review Questions

1. What are four useful organizers for taking lecture notes?

2. Summarize the four steps involved in effective note-taking the indented format.

3. What are advantages and disadvantages of using a tape-recorder for taking notes?

4. What are the advantages and disadvantages of the major outline formats?

ADDITIONAL GUIDELINES FOR THE INDENTED FORMAT

Below are some additional guidelines for taking notes via the indented format that should serve to facilitate learning.

- Indentations should be used to indicate a new thought or idea.

- The stairstep method of placing the indentation marks should be used. Each different notch along the lefthand margin means something:

    - the farthest notch to the left indicates the title of the notes.

    - all succeeding indentations will be to the right of the title as modifiers.

    - the second farthest indentation to the left should be the concept word/head.

    - parallel phrasing should be used for all similar and equal indentations which modify the topic.

    - the stairstep placement of the indentations coveys the level of importance, communication, or generality.

    - the farther to the right that you indent, the more detailed the information becomes.

Look at the following example for further clarification:

Title

-Concept
-topic
-detail
-sub detail
-sub detail

-topic
-detail

-topic
-detail
-sub detail
-sub detail
-sub detail
-sub detail

-topic

-topic

1. If there is not enough room to complete an idea on the same line, continue the thought on the next line immediately under the appropriate detail word.

2. Incorporate symbols and abbreviations wherever possible.

3. Learn to make connections. A connection is the use of an arrow from a noun from a preceding line/phrase to a modifying detail about that word in the following indentation. Connecting is necessary when a smooth flow from one detail to the next is desired.

   e.g.:

   <u>Cutaneous Viral Diseases</u>

   -small <u>pox</u>

   -chicken

   -<u>measles</u>

   -German

4. A sentence check should be done on a completed segment of your notes. A sentence check can be constructed by combining a topic and its details with the addition of a few conjunctions and adjectives. Refer to the example above and then compare with the example below.

   e.g.:

   German measles is a cutaneous viral disease.

Now, using the information you have, read and outline the next passage on chickenpox.

DEVELOPING AN OUTLINER'S PERSPECTIVE

The first thing that you should do is to determine the concept and subconcept words and list them on a blank sheet of paper. You should leave room between the concept and subconcept words for the topics and details.

Now, let's apply this idea.

Read the passage on smallpox. Write the title of the section. Then find and list concept and subconcept headings. See how your listing compares with that on the next page.

CUTANEOUS VIRAL DISEASES

Smallpox (variola). The etiologic agent of smallpox is characterized by its affinity for the epidermis. Transmission is either by direct contact or by droplet infection from the respiratory tract. The skin lesions begin as papules, which later become vesicles, then pustules, and finally crusts. The lesions may be discrete, confluent, or hemorrhagic, the last type being almost always fatal. Healing with pitting of the skin is characteristic of the confluent form. A mild form of the disease, known as alastrim, or para-smallpox, is also recognized. The historic aspects of vaccination with cowpox (vaccinia) are too well known to require discussion here.

Clinically, the disease is characterized by severe headaches and high fever. The fever usually subsides with the appearance of the papular skin lesions but returns with the vesicular and pustular stages of the lesion.

The specific changes of smallpox are seen in the epithelial cells of the skin and mucous membranes. Typical eosinophilic inclusion bodies (Guarnieri bodies) are seen in the cytoplasm of these cells. These inclusions, originally believed by Guarnieri to be protozoa, are now known to consist of closely packed elementary bodies, each having a diameter of about 0.2μ. Intranuclear inclusion bodies occasionally occur. As a result of the presence of the virus, the epithelial cells undergo swelling (ballooning degeneration) and necrosis. Vesiculation and pustule formation occur, but on mucous surfaces the lesions become punched-out ulcers rather than pustules, probably because of the lack of a horny layer.

A fatal outcome may result from secondary bacterial infection in the form of pneumonia, which may lead to septicemia, the etiologic agent being most often a streptococcus or a pneumococcus. It is probable that this bacterial pneumonia is preceded by pneumonia of the viral type. In some instances, however, signs of bacterial infection are not present, and death is believed to be caused by the overwhelming viral infection. Occasionally, acute disseminated encephalitis is a complication.[4]

The title? Cutaneous Viral Diseases

The concept words? Type

Characteristics

Transmission

Outcomes

The concept words are appropriate because each word covers an area mentioned in the passage. The concept words can be used to cover material presented in a similar form.

How do you know what concept words apply to a given reading?

Read the passage in the text in its entirety. As you read, write and think about the author's approach to writing the passage. The concept words should be written in the order of their appearance in the passage.

Now, it's time to practice what you have just read.

Outline the passage on smallpox from the preceding page using the indented method. REMEMBER: details appear under the appropriate concept words.

a detail can have sub details that appear in an indented form under them.

After you complete your outline, refer to the model on the next page.

Your outline should be similar to the following example.

Cutaneous Viral Diseases

-Smallpox
  -type
    -viral

  -transmission
    -direct contact
    -droplet infection
      --respiratory tract

  -characteristics
    -skin lesions
      -papules
        -vesicles
          -pustules
            -crusts

      -discrete
      -confluent
        -skin pitting
      -hemorrhagic
        -can be fatal

    -severe headaches

    -high fever
      -leaves when papular lesions occur
      -returns w/
        -vesicular stage
        -pustular

    -change in epithelial cells
    -seen
      -mucous membrane
      -skin

    -cytoplasm
      -Guarnieri bodies (Eosinophilic Inclusion Bodies)
        -believed to be protozoa
        -known to be elem. bod.
          --diameter of 0.2μ
        -intranuclear i.b. occurs

    -swelling occurs
      -due to virus

    -necrosis
    -vesiculation (occurs)

-pustule
-lesions punched out
-no horny layer

-outcomes
-fatal
-secondary bacterial infec.
-pneumonia
-septicema
-(due) to streptococcus
- pneumococcus

-viral infection

-complication
-acute disseminated encephalitis

What are the results of the comparison of your outline with the model? It is O.K. for differences to exist between your outline and the model. The goal in outlining is to record information that is important for you to remember in an organized fashion. Therefore, your outline will reflect the points that you feel you need to remember.

PRACTICE EXERCISES

Again, using the information you have, read and outline the next passage on chickenpox.

Chickenpox (varicella). Chickenpox is a mild viral infection of childhood characterized by a typical skin eruption. The disease is acquired either by direct contact or through the upper respiratory tract. The cutaneous lesions are most numerous on the face and trunk but eventually have a generalized distribution, often including the buccal and pharyngeal mucosa. They pass through macular and papular stages and become vesicular, with a surrounding bright red erythematous ring. Eventually, crusts form, beneath which epithelial repair takes place. Fresh crops of lesions appear in the same skin areas on successive days, so that lesions in various stages of development may appear side by side. This is in contrast to the lesions of smallpox, which evolve simultaneously.

Microscopic examination of the lesions shows congestion and edema of the corium, with mononuclear cell infiltration. Vesicles containing fluid are found in the epidermis. Vesicle formation is preceded by ballooning degeneration and disruption of epidermal cells. Some of the affected cells become multinucleated (Tzanck giant cells). Nuclear eosinophilic inclusions are found in many of the epidermal cells, including the multinucleated ones.

The rare fatalities that occur are usually associated with disseminated infection, in which case similar inclusions are found in the viscera. Varicella pneumonia has been described in adults and may be fulminant and fatal. The complication of postinfection (acute disseminated) encephalomyelitis is a rare occurrence. (5)

Your outline should be similar to this model.

Cutaneous Viral Diseases

- Chickenpox (varicella)
  - type
    - viral infection
  - transmission
    - direct contact
    - upper respiratory tract
  - characteristics
    - typical skin eruption
      - face
      - trunk
      - generalized distribution
        - often on buccal & pharyngeal mucosa
    - stages
      - macular
      - papular
      - vesicular
        - red erythematous ring
    - crust forms
      - epithelial repair occurs
    - lesions appear daily
      - can see various stages
      - congestion & edema of corium
        - mononuclear cell infiltration
      - vesicles containing fluid found
        - in skin
        - preceded by
          - degeneration (ballooning)
          - disruption
      - some cells become multinucleated
        - (Tzanck giant cells)
      - nuclear eosinophilic inclusions found
        - in epidermal cells
        - in
  - outcomes
    - fatalities
      - disseminated infection
        - inclusions found in viscera
      - varicella pneumonia
        - found in adults
          - fulminant
          - fatal
    - complications
      - postinfection encephalomyelitis
        - acute disseminated

An additional practice exercise appears below.

Herpes zoster. Herpes zoster (shingles) is characterized by the formation of an erythematous and vesicular eruption along the course of sensory nerves. The lesions occur on the trunk or face and usually are associated with pain, discomfort, fever, and malaise. Involvement of the eye (zoster ophthalmicus) may have serious results unless treated promptly.

The cutaneous vesicular lesions are microscopically similar to those of varicella and also show acidophilic nuclear inclusion bodies. The basic lesion, however, is degeneration in the posterior root ganglia with associated perivascular mononuclear infiltration. In the process of healing, portions of the ganglia may be converted into scar tissue. It is generally agreed that varicella and herpes zoster are different manifestations of an infection caused by a single virus known as the varicella-zoster (VZ) virus. (6)

Cutaneous Viral Diseases

-Herpes zoster (shingles)

-type
-viral infection

-transmission
-varicella-zoster virus
-like chickenpox

-characteristics
-formation of erythematous
-vesicular eruption along sensory nerves
-lesions
-occur
-face
-trunk
-associated w/
-pain
-fever
-discomfort
-malaise
-similar to chickenpox
-acidophilic nuclear inclusion bodies
-degeneration of posterior root ganglia
-associated w/ perivascular mononuclear infiltration

-outcomes
-involvement of eye
-serious results
-immediate treatment necess.
-scar tissue
-results from healing process of ganglia

NOTE-TAKING IN ACTION

You should now be ready to take notes from a lecture. Please, however, review any areas in this unit that are unclear to you.

Secure a tape-recorder from Learning and Assessment Lab personnel, one of the lecture tapes, and prepare to practice taking lecture notes from an actual lecture. Remember that initially you should record all of the important points presented in the lecture. Second, fill in the gaps from the lecture. Finally, rewrite your notes employing the indented format.

Please begin listening to the prerecorded lecture.

The indented format is easy to learn and to use. With practice, organizers, and short cuts, you will reach the level of note-taking ability that will allow you to take excellent notes in an outline format during lectures. The content of your notes will contain all pertinent information presented thus enabling you to improve in-course performances.

However, if the indented format is too:

much for you

time-consuming

practice-oriented

then you might find the Key Word and Summary Method appealing.

KEY WORDS AND SUMMARY METHOD

for taking and reviewing lecture notes

When taking lecture notes, leave rather wide margins on the left and right sides of the page. Then, when reviewing your notes (if at all possible; within 24 hours after taking them), use the margins as described below:

The topic of the lecture should
be written at the top of the page
when taking notes.

In the lefthand margin,
write the KEY WORDS
from each line.

In the righthand margin,
write one or two sentences
summarizing the material
on the page.

Some advantages of this method are:

1. Helps you to retain the lecture material.
   --Studies show that the typical student forgets about 60 percent of new material within 24 hours after it is presented.

2. Forces you to think about the material in terms of its important ideas.

3. Helps build the vocabulary you will need to perform well in the subject--in discussion, the writing of papers, exams, etc.

4. Provides organized study material for final review before exams.

5. Saves time. IF you have reading assignments that cover the same topic discussed in lecture, you save time and study more effectively by coordinating the two.

   TRY THIS METHOD: When you take notes, use only one side of the opened notebook for lecture notes. Save the other side for notes from the text. When taking text notes, record only the points that are not covered in the lecture. This method can be used effectively with SQ3R. SQ3R involves Surveying the lecture notes, forming Questions out of the concept heads (characteristics of chickenpox are ...), Read your notes, Recite them to yourself, and Record the notes placing key words on the left and summary sentences on the right.

ADDITIONAL PRACTICE EXERCISES

Molluscum contagiosum. Molluscum contagiosum is a benign skin disease characterized by the occurrence of raised, umbilicated, waxy cutaneous nodules. The lesions may be multiple, in which case the diagnosis usually is made clinically, or single, in which case the lesion may be suspected of being neoplastic and often is excised for diagnosis. The lesions heal spontaneously, usually after a few months, and are not associated with constitutional symptoms.

The prickle cells of the epidermis undergo hyperplasia and degeneration, with the development of rounded hyaline masses (molluscum bodies) in their cytoplasm. These eosinophilic (sometimes basophilic) inclusion bodies, as seen by electron microscopy, are aggregations of the minute elementary bodies of the virus. (7)

Do your notes look like the outline on this page?

-molluscum contagiosum

-type
-benign skin disease

-characteristics
-nodules (cutaneous)
-raised, umbilicated, waxy
-lesions
-multiple
-clinical diagnosis
-single
-excised for
-suspect neoplastic
-heal spontaneously
-few months
-not assoc. w/ constitu. symptoms
-epidermis (prickle cells)
-(undergo) hyperplasia
- degeneration
-caused by molluscum bodies
-w/i cytoplasm
-minute elem. bodies of virus

German measles (rubella). German measles is a mild exanthem affecting children and young adults. A macular rash develops rapidly on the head and trunk and disappears in a few days. The rubella virus has been isolated and found to be an RNA virus that is distinct from the measles virus.

The most important aspect of this otherwise rather trivial infection is the occurrence of congenital abnormalities in some infants born of mothers who acquire the disease in the early months of pregnancy. The virus may interfere with normal fetal development, the most common defects being microcephaly, deaf-mutism, cardiac abnormalities, cataract, and dental defects. In one carefully conducted prospective study, it was noted that major defects occurred in 15% of children of mothers who had rubella during the first sixteen weeks of pregnancy and that minor abnormalities were seen in an additional 16% of children. The term "rubella syndrome" is used in reference to those infants born with congenital anomalies following intrauterine infection with rubella virus. Other features of this syndrome include thrombocytopenic purpura, icterus, anemia, hepatosplenomegaly, low birth weight, and radiolucent areas in the metaphyses of long bones. (8)

Do your notes look like the outline on this page?

Cutaneous Viral Diseases

- -German measles (rubella)
  - -type
    - -mild exanthem
      - -(affects) children
      - - young adults
    - -RNA virus
      - -unlike measles
  - -characteristics
    - -macular rash
      - -head
      - -trunk
  - -outcomes
    - -infected pregnant women
      - -birth defects in child
        - -deaf-mutism
        - -cardiac abnormalities
        - -cataract
        - -dental
        - -major
          - -15% of children of infected ♀
        - -minor
          - -16%
      - -congenital anomalies (rubella syndrome)
        - -caused by intrauterine infection
          - -rubella virus
        - -features
          - -thrombocytopenic purpura
          - -icterus
          - -anemia
          - -hepatosplenomegaly
          - -low birth wt.
          - -radiolucent areas
            - --metaphyses of long bones

PART THREE

TEXT NOTE-TAKING

TEXT NOTE-TAKING REMINDERS FROM PART ONE

By now, we hope you have picked up some form of briefhand, the use of concept words, and organizers. Please be reminded of appropriate organizers related to the text:

1. the course syllabus (if available)
2. the introduction and/or summary of a text
3. the passage titles
4. the relevant concept words for a reading

TEXT NOTE-TAKING PROCESS

The process of taking text notes involves:

1. selecting information from the text to be translated into notes
2. distinguishing between the topic of a passage and the supporting information or details
3. devising an approach for recording notes

Selecting information: It is inappropriate to copy or underline every sentence or even every other sentence in a text and then call those copyings notes. When you review the material copied in that fashion, you will not easily be able to determine what is important and what is not important. Here is an approach that should help you to digest the voluminous amount of information contained in texts. Start out with a sentence like the one below:

e.g. "The etiologic agent of smallpox is characterized by its affinity for the epidermis." (9)

What is the topic?

The topic is smallpox. Underline smallpox in the passage with double lines.

What is the detail or information provided relating to smallpox?

The information is: characterized by its affinity for the epidermis. Underline the key words in that phrase with single lines.

Practice Exercises

Read the paragraph below. Underline the topic words with double lines.

Underline the details and information with single lines.

Cutaneous Viral Diseases

Smallpox (variola). The etiologic agent of smallpox is characterized by its affinity for the epidermis. Transmission is either by direct contact or by droplet infection from the respiratory tract. The skin lesions begin as papules, which later become vesicles, then pustules, and finally crusts. The lesions may be discrete, confluent, or hemorrhagic, the last type being almost always fatal. Healing with pitting of the skin is characteristic of the confluent form. A mild form of the disease, known as alastrim, or para-smallpox, is also recognized. The historic aspects of vaccination with cowpox (vaccinia) are too well known to require discussion here. (10)

Check the next page for a model of a correct response.

Cutaneous Viral Diseases

Smallpox (variola). The etiologic agent of smallpox is characterized by its affinity for the epidermis. Transmission is either by direct contact or by droplet infection from the respiratory tract. The skin lesions begin as papules, which later become vesicles, then pustules, and finally crusts. The lesions may be discrete, confluent, or hemorrhagic, the last type being almost always fatal. Healing with pitting of the skin is characteristic of the confluent form. A mild form of the disease, known as alastrim, or para-smallpox, is also recognized. The historic aspects of vaccination with cowpox (vaccinia) are too well known to require discussion here.

A variation of the approach presented above involves the use of colored pens. For topics, use a bright colored ink. For details, use blue or black ink. Try the colored pen approach on the next paragraph.

The specific changes of smallpox are seen in the epithelial cells of the skin and mucous membranes. Typical eosinophilic inclusion bodies (Guarnieri bodies) are seen in the cytoplasm of these cells. These inclusions, originally believed by Guarnieri to be protozoa, are now known to consist of closely packed elementary bodies, each having a diameter of about 0.2μ. Intranuclear inclusion bodies occasionally occur. As a result of the presence of the virus, the epithelial cells undergo swelling (ballooning degeneration) and necrosis. Vesiculation and pustule formation occur, but on mucous surfaces the lesions become punched-out ulcers rather than pustules, probably because of the lack of a horny layer. (11)

Check the next page to compare your work.

The specific changes of smallpox are seen in the epithelial cells of the skin and mucous membranes. Typical eosinophilic inclusion bodies (Guarnieri bodies) are seen in the cytoplasm of these cells. These inclusions, originally believed by Guarnieri to be protozoa, are now known to consist of closely packed elementary bodies, each having a diameter of about 0.2μ. Intranuclear inclusion bodies occasionally occur. As a result of the presence of the virus, the epithelial cells undergo swelling (ballooning degeneration) and necrosis. Vesiculation and pustule formation occur, but on mucous surfaces the lesions become punched-out ulcers rather than pustules, probably because of the lack of a horny layer.

Only the topic and information in phrases and key words that support the topic are important in text note-taking. You can select for yourself what appears to you to be the most important bit of information and how much detail the topic needs for you to be able to recall the important facts. Unlike taking lecture notes, there is no need to record everything. That is one of the reasons why we will be looking at a variety of text note-taking strategies.

TEXT NOTE-TAKING APPROACHES

There are seven commonly agreed upon text note-taking approaches:

1. summarizing
2. outlining
3. underlining
4. margin notes
5. highlighting
6. indexing
7. a combination

Discrimination between the topic of a reading and the supporting elements and details is crucial to the note-taking approaches.

Let's look at the approaches of text note-taking:

Summarizing - The key points of a section or chapter are written down in paragraph or sentence form. The summary should not be as detailed as an outline. Summarizing takes time and is difficult. It is recommended that summarizing be combined with other note-taking methods, such as outlining, indexing, and margin notes (since a summary is by nature not as detailed as one of the other methods).

Outlining - This approach is recommended when you are studying important materials with which you must be very familiar. Each chapter is outlined so that the learner is forced to organize topics and details. This results in a higher quality of understanding pertaining to the material. The process is time-consuming but effective, since no further rereading of the text is necessary. Examples of the outline forms were presented in the lecture note-taking section. We recommend the indented or dash format.

Underlining - The topic and supporting information are differentiated in passages by underlining (single line for the topic, double line for the supporting information) or by using different colored inks. A key word is usually sought for the topic, while the supporting information usually consists of one or more phrases pulled from supporting sentences. The underlining procedure was presented in the last exercise that you completed.

Margin notes - Key words or symbols that serve as messages telling you what needs to be reread or is important appear in the margin of your text and are written as you read. Phrases are sometimes used to clarify a point made in the text or to minimize rereading time.

Highlighting - The process of utilizing a brightly colored ink to "highlight" words and sentences is called highlighting. The colored ink draws attention to the passage, but highlighting does not usually allow for

sufficient discrimination to take place (highlighters usually color more sentences than are necessary and often end up having to read the same material over again for understanding). Highlighting is the least effective method of taking notes for most people.

Indexing - The development of referral sheets to direct rereading to key points is called indexing. Indexing would take place in the following fashion on a sheet of paper referred to as an index:

p. 246, transmission of smallpox virus cited.

Combination - The six approaches can be presented in a combination form. Margin notes and underlining often appear together, as do summarizing and outlining.

Study/Review Questions

1. Name four organizers that are helpful in taking text notes.

2. What are the three steps that facilitate the text note-taking process?

3. List the six major text note-taking approaches. Compare and contrast the approaches.

4. Compare the text note-taking approach of summarizing with the lecture note-taking paragraph and sentence formats.

PRACTICE EXERCISES

Read the following passage. Employ the underlining-margin notes approach to take notes on the passage.

Measles (rubeola). For years it has been possible to transmit measles only to monkeys but not to other laboratory animals, and for this reason the study of its virus has been difficult. In subsequent investigations, it appears that the measles virus has been adapted to suckling mice, and possibly to suckling hamsters. There are morphologic and immunologic similarities of measles in human beings and distemper in animals.

Measles is highly communicable and is spread chiefly by droplet infection through the upper respiratory tract. Clinically it is characterized by fever, cough, coryza, conjunctivitis, and a distinctive type of nonhemorrhagic macular or maculopapular rash, which is most severe on the face but which involves the entire body. Koplik's spots, which are of early diagnostic significance, occur in the mouth, usually opposite the first molars. They consist of minute white flecks, formed by necrotic epithelial cells and surrounded by a bluish areola, outside of which is a red areola.

The cutaneous lesions show vacuolar degeneration and eventual necrosis of the epithelial cells and considerable perivascular lymphocytic infiltration, with endothelial proliferation in the capillaries, arterioles, and venules. The capillaries are greatly congested and occasionally rupture to form minute areas of hemorrhage in the corium. Koplik's spots show an essentially similar picture. Epidermal syncytial giant cells, as well as intranuclear and intracytoplasmic inclusions in some of these cells, have been demonstrated in the lesions of the skin and oral mucosa (Koplik's spots). By electron microscopy, the inclusions were identified as viral, microtubular aggregates resembling those seen in tissue cultures infected with measles virus.

In fatal cases, death usually is caused by bronchopneumonia. It is difficult to separate the lesions caused by bacterial pneumonia from those produced by the initial viral infection. Most fatalities occur late in the course of the disease, and although the bronchopneumonia seen then is often of the interstitial type, it has no particularly characteristic features. In patients dying early in the course of the illness, a peculiar type of pneumonia with giant cell formation and nuclear and cytoplasmic inclusions has been described (p. 244). In addition to bronchopneumonia, other bacterial infections may complicate measles, especially otitis media. Postinfection encephalitis is a rare and serious complication. Cytoplasmic and sometimes intranuclear inclusions, as well as multinucleated giant cells, have been demonstrated in the brains of some patients with fatal measles encephalitis.

In prodromal measles, large multinucleated cells have been observed in the lymphoid tissue of lymph nodes, tonsils, adenoids, Peyer's patches, and appendix (Fig. 8-9). These cells in lymphoid tissue, believed by some to be formed by fusion of lymphocytes and possibly plasma cells, are known as Warthin-Finkeldey giant cells. Occasionally, the finding of these giant cells in routine examination of surgically removed appendices has enabled the pathologist to make a diagnosis of measles before the appearance of the rash or Koplik's spots. Cytologic examination of nasal smears from children with catarrhal symptoms may enable early diagnosis by recognition of these characteristic giant cells of measles. (12)

Here is what the model looks like:

highly communicable

Measles (rubeola). For years it has been possible to transmit measles only to monkeys but not to other laboratory animals, and for this reason the study of its virus has been difficult. In subsequent investigations, it appears that the measles virus has been adapted to suckling mice, and possibly to suckling hamsters. There are morphologic and immunologic similarities of measles in human beings and distemper in animals.

char:
1. fever
2. cough
3. coryza
4. conjunctiv.
5. rash
   a. macular (nonh.)
   b. maculopapular

Measles is highly communicable and is spread chiefly by droplet infection through the upper respiratory tract. Clinically it is characterized by fever, cough, coryza, conjunctivitis, and a distinctive type of nonhemorrhagic macular or maculopapular rash, which is most severe on the face but which involves the entire body. Koplik's spots, (which are of early diagnostic significance,) occur in the mouth, usually opposite the first molars. They consist of minute white flecks, (formed by necrotic epithelial cells and surrounded by a bluish areola, outside of which is a red areola.)

type:
   viral disease

The cutaneous lesions show vacuolar degeneration and eventual necrosis of the epithelial cells and considerable perivascular lymphocytic infiltration, with endothelial proliferation in the capillaries, arterioles, and venules. The capillaries are greatly congested and occasionally rupture to form minute areas of hemorrhage in the corium. Koplik's spots show an essentially similar picture. Epidermal syncytial giant cells, as well as intranuclear and intracytoplasmic inclusions in some of these cells, have been demonstrated in the lesions of the skin and oral mucosa (Koplik's spots). By electron microscopy, the inclusions were identified as viral, microtubular aggregates resembling those seen in tissue cultures infected with measles virus.

death:
   bronchopneumonia

In fatal cases, death usually is caused by bronchopneumonia. It is difficult to separate the lesions caused by bacterial pneumonia from those produced by the initial viral infection. Most fatalities occur late in the course of the disease, and although the bronchopneumonia seen then is often of the interstitial type, it has no particularly characteristic features. In patients dying early in the course of the illness, a peculiar type of pneumonia with giant cell formation (and nuclear and cytoplasmic inclusions) has been described (p. 244). In addition to bronchopneumonia, other bacterial infections may complicate measles, especially otitis media. Postinfection encephalitis is a rare and serious complication. Cytoplasmic and sometimes intranuclear inclusions, as well as multinucleated giant cells, have been demonstrated in the brains of some patients with fatal measles encephalitis.

complications:
   bacterial infections
   postinfection encephalitis

In prodromal measles, large multinucleated cells have been observed in the lymphoid tissue of lymph nodes, tonsils, adenoids, Peyer's patches, and appendix (Fig. 8-9). These cells in lymphoid tissue, believed by some to be formed by fusion of lymphocytes and possibly plasma cells, are (known as Warthin-Finkeldey giant cells.) Occasionally, the finding of these giant cells in routine examination of surgically removed appendices has enabled the pathologist to make a diagnosis of measles before the appearance of the rash or Koplik's spots. Cytologic examination of nasal smears from children with catarrhal symptoms may enable early diagnosis by recognition of these characteristic giant cells of measles.

The last practice exercise is only one of the various approaches that can be used to take textbook notes. How did it work for you?

During the next couple of moments or in the next couple of days, work on another method for taking text notes that you feel will be appropriate for you. REMEMBER: What works for you in taking text notes is the approach you should use.

FOOTNOTES

1. Anderson, W.A.D. and Scotti, T.M. Synopsis of Pathology. 9th Ed. St. Louis: C.V. Mosby Publishing Co., 1976, p. 252.
2. Ibid., p. 248.
3. Willey, M.S. and Jarecky, B.M. Analysis and Application of Information. 1977.
4. Anderson & Scotti, op. sit., pp. 246-47.
5. Ibid., pp. 247-48.
6. Ibid., p. 248.
7. Ibid., p. 252.
8. Ibid., p. 251-52.
9. Ibid., p. 246.
10. Ibid., p. 246-47.
11. Ibid., p. 247.
12. Ibid., p. 250-51